

<i>Title:</i> TOS Site Characterization Report: Domain 02		<i>Date:</i> 01/05/2017
<i>NEON Doc. #:</i> NEON.DOC.003886	<i>Author:</i> R.Krauss	<i>Revision:</i> A

TOS SITE CHARACTERIZATION REPORT: DOMAIN 02

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CHANGE RECORD

REVISION	DATE	ECO#	DESCRIPTION OF CHANGE
A	01/05/2017	ECO-04382	Initial Release

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1 DESCRIPTION

1.1 Purpose

Domain and site-specific information collected and described here is used to inform the execution of protocols for the NEON Terrestrial Observation System (TOS), and complements the official NEON TOS data products generated from each site. In addition, the TOS spatial layout and plot allocation is described for each site within the domain.

1.2 Scope

This document includes any site specific characterization methods and the results of characterization efforts for each of the three sites in the Mid-Atlantic domain. For more information about the sampling methods, reference the TOS Site Characterization Methods Document (RD[06]). The geographic coordinates for all TOS sampling locations can be found in the Reference Documents area of the NEON Data Portal and are provided with TOS data product downloads.

2 RELATED DOCUMENTS AND ACRONYMS

2.1 Applicable Documents

Applicable documents contain information that shall be applied in the current document. Examples are higher level requirements documents, standards, rules and regulations.

AD[01]	NEON.DOC.004300	EHSS Policy, Program, and Management Plan
AD[02]	NEON.DOC.050005	Field Operations Job Instruction Training Plan
AD[03]	NEON.DOC.000909	TOS Science Design for Ground Beetle Abundance and Diversity
AD[04]	NEON.DOC.000910	TOS Science Design for Mosquito Abundance, Diversity and Phenology
AD[05]	NEON.DOC. 000912	TOS Science Design for Plant Diversity
AD[06]	NEON.DOC.000915	TOS Science Design for Small Mammal Abundance and Diversity
AD[07]	NEON.DOC.000914	TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index
AD[08]	NEON.DOC.000001	NEON Observatory Design

2.2 Reference Documents

Reference documents contain information complementing, explaining, detailing, or otherwise supporting the information included in the current document.

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RD[01]	NEON.DOC.000008	NEON Acronym List
RD[02]	NEON.DOC.000243	NEON Glossary of Terms
RD[03]	NEON.DOC.000913	TOS Science Design for Spatial Sampling
RD[04]	NEON.DOC.011046	TIS Site Characterization Report
RD[05]	NEON.DOC.001589	AIS Site Characterization Report
RD[06]	NEON.DOC.003885	TOS Site Characterization Methods
RD[07]	NEON.DOC.000481	TOS Protocol and Procedure: Small Mammal Sampling
RD[08]	NEON.DOC.014041	TOS Protocol and Procedure: Breeding Landbird Abundance and Diversity

2.3 Acronyms

Acronym	Definition
BOLD	Barcode of Life Datasystems
NLCD	National Land Cover Database

3 DOMAIN 02 OVERVIEW: MID-ATLANTIC DOMAIN

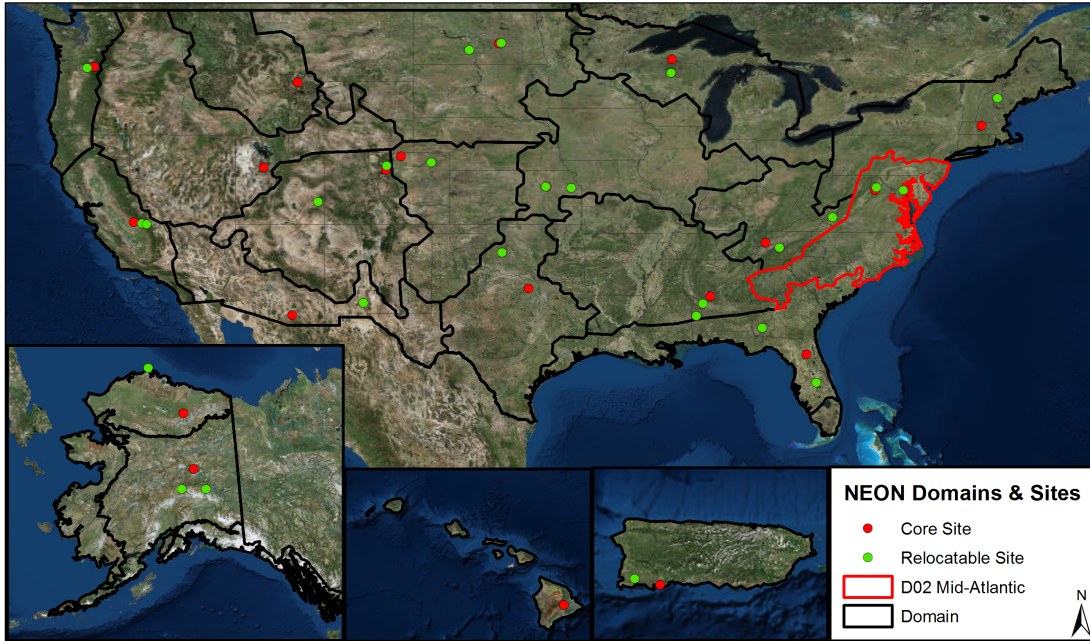


Figure 1: NEON project map with Domain 02 highlighted in red.

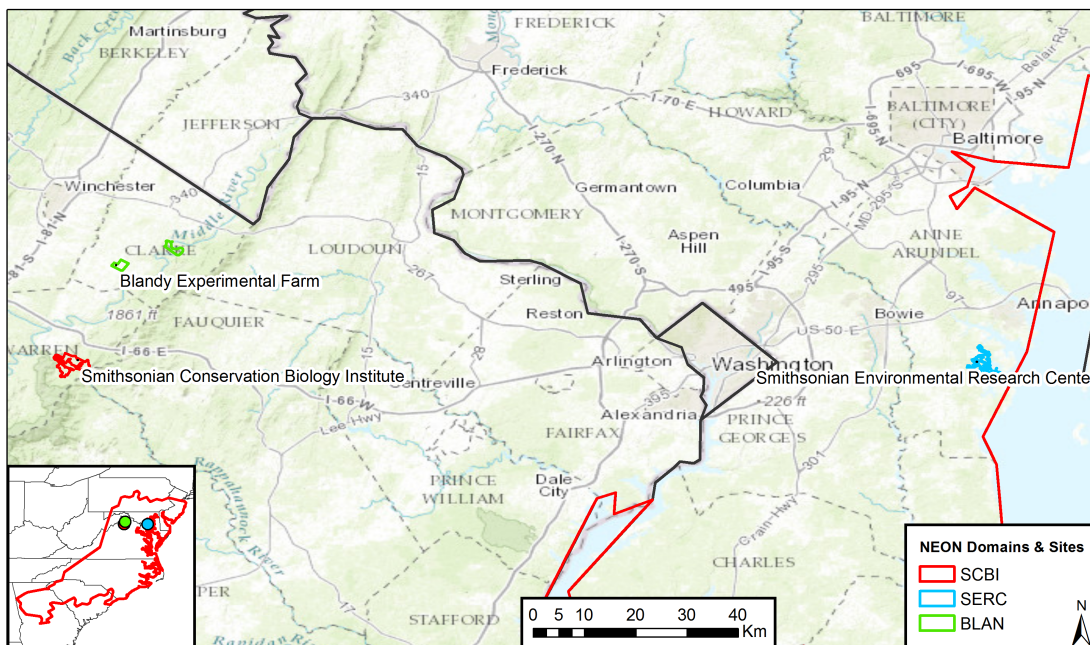


Figure 2: Site boundaries within Domain 02.

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The Mid-Atlantic domain sites are located in a broad matrix of land use types: urban and suburban environments, agriculture, fallow lands, managed and national forests, and national parks. The three sites are located in managed forests, coastal forest, and managed and fallow shrub land, respectively. Each site is influenced by the surrounding landscape and land use types, and as such, addresses the increasing impact of land use change on ecosystem processes, aquatic systems, biodiversity, infectious disease and invasive species.

- States included in the domain: Delaware, Georgia, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, and West Virginia
- Core site: Smithsonian Conservation Biology Institute
- Relocatable 1: Smithsonian Environmental Research Center
- Relocatable 2: Blandy Experimental Farm
- Science themes: Invasive Species

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4 CORE SITE- SMITHSONIAN CONSERVATION BIOLOGY INSTITUTE (SCBI)

The SCBI site consists of mature (> 100 year) and young (< 40 year) secondary forest that is primarily deciduous and indicative of hardwood forests in the Middle Atlantic Domain.

The Smithsonian Conservation Biology Institute facilitates and promotes research programs in Front Royal, Virginia, the National Zoo in Washington, DC, and at field-research and training sites around the world.

Key Characteristics:

- Site host: Smithsonian Institution
- Located in: Warren County, Virginia
- Area: 9.87 km²
- Elevation: 250-575m
- Dominant vegetation type- The forest at SCBI is dominated by oak, hickory, ash and tulip poplar (*Liriodendron tulipifera*). Young forests are dominated by white ash (*Fraxinus americana*), black locust (*Robinia pseudoacacia*), and dogwood. Invasive tree species (autumn olive (*Elaeagnus umbellata*), tree-of-heaven (*Ailanthus altissima*), princess tree (*Paulownia tomentosa*)) are present along edges and disturbed sites.
- At the SCBI, the forest was logged multiple times during the past 300 years and was managed mostly as farmland when acquired by the federal government in 1909. In 1975 the site was acquired by the Smithsonian to support the Smithsonian's National Zoo's wildlife conservation programs.
- The NEON Aquatic Site, Posey Creek, is located west of the NEON tower at SCBI. See the AIS site characterization report for more details (RD[05]).
- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

4.1 TOS Spatial Sampling Design

TOS plots were allocated at SCBI according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. At SCBI, some of the mixed forest was erroneously classified as evergreen forest by the NLCD. Due to this uncertainty, these parts of the landscape will not be sampled initially. The evergreen forest pixels will be reclassified with data from NEON's remote sensing platform and there will be a slight reallocation of sampling effort to facilitate observation of all target components of the landscape. TOS plots that are distributed throughout the site according to the spatial design are hereafter referred to as 'Distributed Plots'. TOS plots that are randomly allocated within the airshed of the NEON Terrestrial Instrument System (TIS) tower to collect complementary data are not stratified by NLCD class; these plots are hereafter referred to as 'Tower Plots'. The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

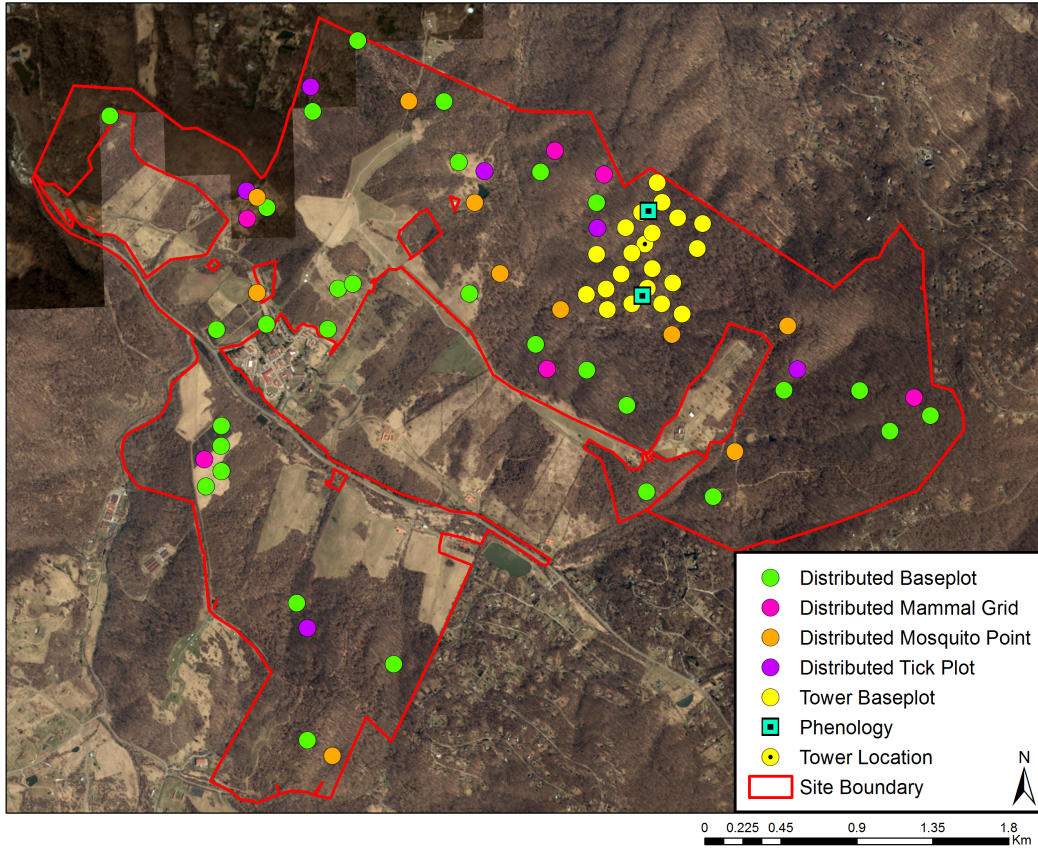


Figure 3: Map of TOS plot centroids within the NEON TOS sampling boundary at SCBI.

For a list of protocols associated with each plot see tables below; for additional spatial design information see RD[03].

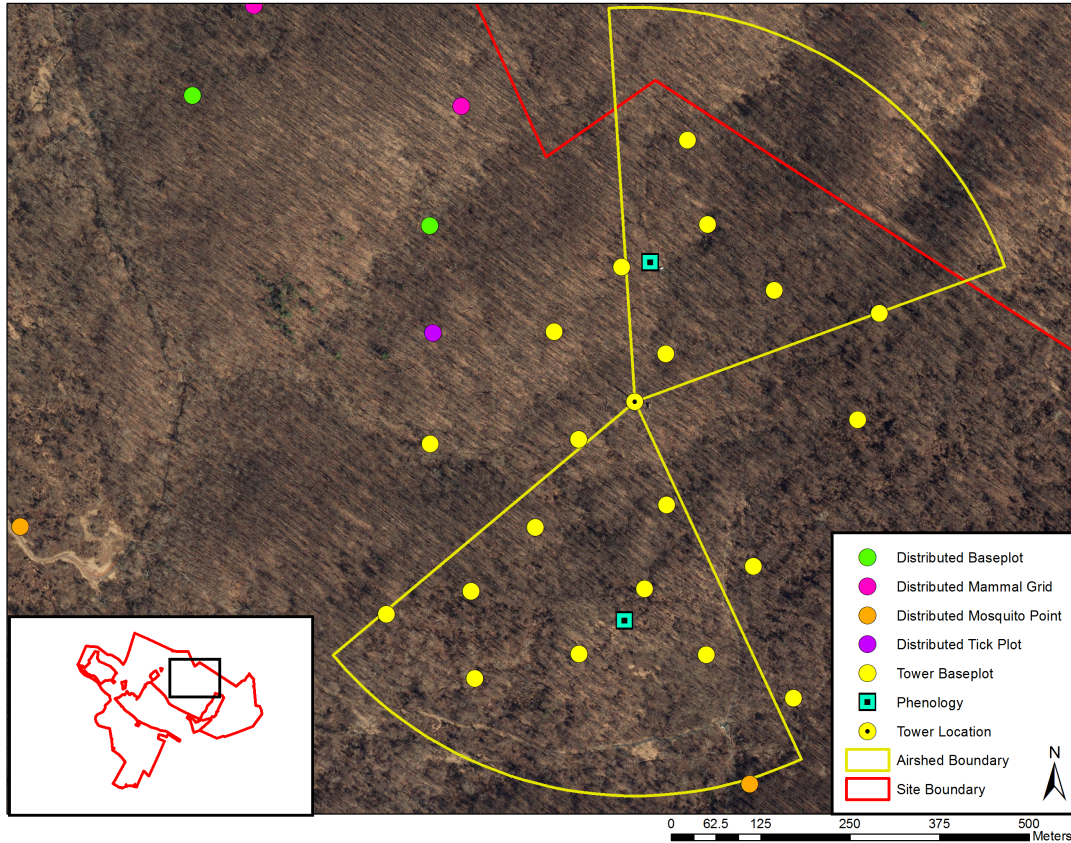


Figure 4: Map of the tower airshed and TOS plot centroids at SCBI.

More information about the tower airshed can be found in the FIU site characterization report (RD[04]).

Table 1: NLCD land cover classes and area within the TOS site boundary at SCBI.

NLCD Class	Site Area (km ²)	Percent (%)
Deciduous Forest	7.47	75.27
Pasture Hay	1.31	13.17
Developed Open Space	0.53	5.39
Evergreen Forest	0.51	5.13
Developed Low Intensity	0.06	0.64
Mixed Forest	0.03	0.34

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 2: NLCD land cover classes and TOS plot numbers at SCBI.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Deciduous Forest	18
Distributed	Base Plot	Pasture Hay	12
Distributed	Mammal Grid	Deciduous Forest	4
Distributed	Mammal Grid	Pasture Hay	2
Distributed	Mosquito Point	Deciduous Forest	7
Distributed	Mosquito Point	Pasture Hay	3
Distributed	Tick Plot	Deciduous Forest	4
Distributed	Tick Plot	Pasture Hay	2
Tower	Base Plot	NA	20
Tower	Phenology Plot	NA	2

Note: NLCD land cover classes are not used to stratify Tower Plots.

Table 3: Number of Distributed Base Plots per NLCD land cover class per protocol at SCBI.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Beetles	7
Distributed	Base Plot	Pasture Hay	Beetles	3
Distributed	Base Plot	Deciduous Forest	Birds	18
Distributed	Base Plot	Pasture Hay	Birds	6
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	4
Distributed	Base Plot	Pasture Hay	Canopy Foliage Chemistry	2
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	14
Distributed	Base Plot	Pasture Hay	Coarse Downed Wood	6
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	14
Distributed	Base Plot	Pasture Hay	Digital Hemispherical Photos for Leaf Area Index	6
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	14
Distributed	Base Plot	Pasture Hay	Herbaceous Biomass	6
Distributed	Base Plot	Deciduous Forest	Plant Diversity	18
Distributed	Base Plot	Pasture Hay	Plant Diversity	12
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	4
Distributed	Base Plot	Pasture Hay	Soil Biogeochemistry	2

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Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Soil Microbes	4
Distributed	Base Plot	Pasture Hay	Soil Microbes	2
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	14
Distributed	Base Plot	Pasture Hay	Vegetation Structure	6

Note: Distributed Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Distributed Base Plot number.

Table 4: Number of Tower Plots per protocol at SCBI.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Below Ground Biomass Coring	20
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	20
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	20
Tower	Base Plot	Herbaceous Biomass	20
Tower	Base Plot	Litterfall and Fine Woody Debris	20
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	20
Tower	Phenology	Plant Phenology	2

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get the total TOS Tower Base Plot number.

4.2 Belowground Biomass

4.2.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 200 cm by NEON staff in May 2013. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 2 mm and 2-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to

30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

4.2.2 Results

Table 5: Fine root mass per depth increment (cm) at SCBI.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	4.73	3.12
10	20	1.62	0.83
20	30	1.21	0.55
30	40	0.56	0.39
40	50	0.75	0.63
50	60	1.15	1.52
60	70	0.16	0.17
70	80	0.09	0.08
80	90	0.04	0.01
90	100	0.02	0.03
100	120	0.23	0.12
120	140	1.21	0.49
140	160	1.55	1.47
160	180	0.14	0.09
180	200	0.03	0.03

Table 6: Cumulative fine root mass as a function of depth (cm) at SCBI.

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
0	10	472.95	312.2
10	20	634.48	393.04
20	30	755.16	345.31
30	40	811.27	308.42
40	50	885.98	277.21
50	60	1000.67	201.23
60	70	1017.15	201.55
70	80	1026.47	198.67
80	90	1030.55	200.13

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
90	100	1032.82	200.03
100	120	1077.97	221.61
120	140	1319.23	178.11
140	160	1629.03	162.84
160	180	1657.54	165.02
180	200	1663.49	169.49

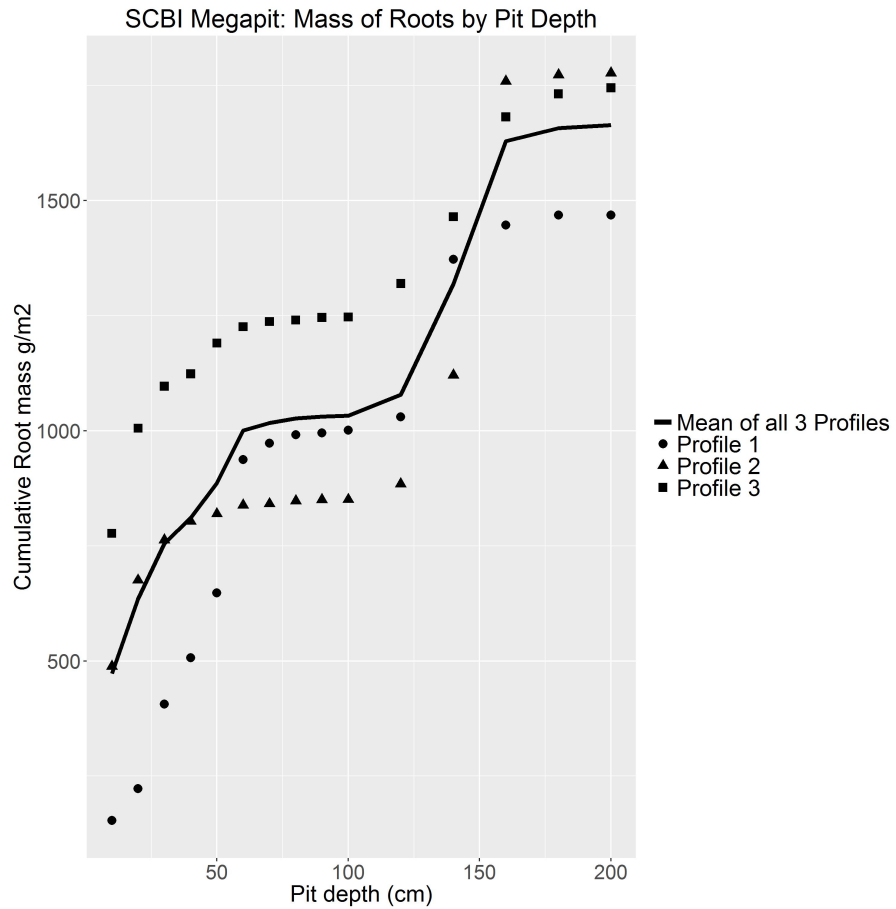


Figure 5: Cumulative root mass by pit depth at SCBI.

Table 7: Fine root biomass sampling summary data at SCBI.

Total Pit Depth (cm)	200
Total Cumulative Mass at 30cm (g per m ²)	755.16
Total Cumulative Mass at 100cm (g per m ²)	1032.82
Total Cumulative Mass (g per m ²)	1663.49

4.3 Plant Characterization and Phenology Species Selection

4.3.1 Site-Specific Methods

Plant characterization data were collected by an external contractor during the summer of 2013 following the standard methods outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A.

4.3.2 Results

Table 8: Site plant characterization and phenology species summary at SCBI.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
LITU	<i>Liriodendron tulipifera</i> L.	1	<1	NA	13.38
MIVI	<i>Microstegium vimineum</i> (Trin.) A. Camus	2	11	NA	NA
FRAM2	<i>Fraxinus americana</i> L.	3	9	NA	1.84
QUAL	<i>Quercus alba</i> L.	4	<1	NA	2.99
QURU	<i>Quercus rubra</i> L.	5	<1	NA	2.97
QUVE	<i>Quercus velutina</i> Lam.	6	<1	NA	2.86
LIBE3	<i>Lindera benzoin</i> (L.) Blume	7	2	NA	0.17
AMBR2	<i>Amphicarpaea bracteata</i> (L.) Fernald	8	2	NA	NA
SYOR	<i>Symphoricarpos orbiculatus</i> Moench	9	2	NA	NA
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	10	<1	NA	1.64
ALPE4	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	11	1	NA	NA
LOJA	<i>Lonicera japonica</i> Thunb.	12	1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
ULMUS	<i>Ulmus</i> sp.	13	1	NA	0.34
QUMO4	<i>Quercus montana</i> Willd.	14	NA	NA	1.23
CATO6	<i>Carya tomentosa</i> (Lam.) Nutt.	15	NA	NA	1.09
CECAC	<i>Cercis canadensis</i> L. var. <i>canadensis</i>	16	<1	NA	0.16
ELRI	<i>Elymus riparius</i> Wiegand	17	<1	NA	NA
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	18	<1	NA	NA
RUFL	<i>Rubus flagellaris</i> Willd.	19	<1	NA	NA
GATR3	<i>Galium triflorum</i> Michx.	20	<1	NA	NA
NYSY	<i>Nyssa sylvatica</i> Marshall	21	<1	NA	0.77
VIPU3	<i>Viola pubescens</i> Aiton	22	<1	NA	NA
POVI2	<i>Polygonum virginianum</i> L.	23	<1	NA	NA
CILUC	<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Asch. & Magnus	24	<1	NA	NA
JUNI	<i>Juglans nigra</i> L.	25	NA	NA	0.66
CAOV3	<i>Carya ovalis</i> (Wangenh.) Sarg.	26	NA	NA	0.63
UVPE	<i>Uvularia perfoliata</i> L.	27	<1	NA	NA
CACO15	<i>Carya cordiformis</i> (Wangenh.) K. Koch	28	<1	NA	0.48
VEOC	<i>Verbesina occidentalis</i> (L.) Walter	29	<1	NA	NA
FESU3	<i>Festuca subverticillata</i> (Pers.) Alexeev	30	<1	NA	NA
ACRU	<i>Acer rubrum</i> L.	31	<1	NA	0.37
FAGR	<i>Fagus grandifolia</i> Ehrh.	32	NA	NA	0.4
SMRO	<i>Smilax rotundifolia</i> L.	33	<1	NA	NA
SAAL5	<i>Sassafras albidum</i> (Nutt.) Nees	34	<1	NA	0.13
PHLE5	<i>Phryma leptostachya</i> L.	35	<1	NA	NA
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	35	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CYVIV	<i>Cynoglossum virginianum</i> L. var. <i>virginianum</i>	37	<1	NA	NA
TIAM	<i>Tilia americana</i> L.	38	<1	NA	0.3
GACI2	<i>Galium circaezans</i> Michx.	39	<1	NA	NA
CACA18	<i>Carpinus caroliniana</i> Walter	40	NA	NA	0.29
SACA15	<i>Sanicula canadensis</i> L.	41	<1	NA	NA
SMTA2	<i>Smilax tamnoides</i> L.	42	<1	NA	NA
CEOC	<i>Celtis occidentalis</i> L.	43	<1	NA	0.05
POPE10	<i>Polygonum perfoliatum</i> L.	44	<1	NA	NA
COFL2	<i>Cornus florida</i> L.	45	<1	NA	0.09
PIST	<i>Pinus strobus</i> L.	46	NA	NA	0.22
PLOC	<i>Platanus occidentalis</i> L.	47	NA	NA	0.21
ASTR	<i>Asimina triloba</i> (L.) Dunal	48	<1	NA	0.08
BOVI	<i>Botrychium virginianum</i> (L.) Sw.	49	<1	NA	NA
GECA7	<i>Geum canadense</i> Jacq.	50	<1	NA	NA
ROPS	<i>Robinia pseudoacacia</i> L.	51	<1	NA	0.07
ROMU	<i>Rosa multiflora</i> Thunb.	52	<1	NA	0
CEOR7	<i>Celastrus orbiculatus</i> Thunb.	53	<1	NA	NA
CARA8	<i>Carex radiata</i> (Wahlenb.) Small	54	<1	NA	NA
PRSE2	<i>Prunus serotina</i> Ehrh.	55	<1	NA	0.08
POCE4	<i>Polygonum cespitosum</i> Blume, nom. inq.	56	<1	NA	NA
VITIS	<i>Vitis</i> sp.	57	<1	NA	NA
ARTR	<i>Arisaema triphyllum</i> (L.) Schott	58	<1	NA	NA
SOCA4	<i>Solidago caesia</i> L.	58	<1	NA	NA
CAAM8	<i>Carex amphibola</i> Steud.	60	<1	NA	NA
SOUL2	<i>Solidago ulmifolia</i> Muhl. ex Willd.	60	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
ASPL	<i>Asplenium platyneuron</i> (L.) Britton, Sterns & Poggenb.	62	<1	NA	NA
LEVI2	<i>Leersia virginica</i> Willd.	62	<1	NA	NA
FRNI	<i>Fraxinus nigra</i> Marshall	64	NA	NA	0.09
VITR2	<i>Viola triloba</i> Schwein.	65	<1	NA	NA
PRAV	<i>Prunus avium</i> (L.) L.	66	<1	NA	0.07
DIQU	<i>Dioscorea quaternata</i> J.F. Gmel.	67	<1	NA	NA
ELHY	<i>Elymus hystrix</i> L.	67	<1	NA	NA
SACA13	<i>Sanguinaria canadensis</i> L.	67	<1	NA	NA
GALA4	<i>Galium latifolium</i> Michx.	70	<1	NA	NA
HAVI4	<i>Hamamelis virginiana</i> L.	71	NA	NA	0.07
LOMA6	<i>Lonicera maackii</i> (Rupr.) Herder	72	<1	NA	0
CAREX	<i>Carex</i> sp.	73	<1	NA	NA
POAC4	<i>Polystichum acrostichoides</i> (Michx.) Schott	73	<1	NA	NA
VIPR	<i>Viburnum prunifolium</i> L.	75	<1	NA	0.03
RUPH	<i>Rubus phoenicolasius</i> Maxim.	76	<1	NA	0
CABL	<i>Carex blanda</i> Dewey	77	<1	NA	NA
RUOC	<i>Rubus occidentalis</i> L.	77	<1	NA	NA
BRPU6	<i>Bromus pubescens</i> Muhl. ex Willd.	80	<1	NA	NA
ELCA4	<i>Elymus canadensis</i> L.	80	<1	NA	NA
STPU	<i>Stellaria pubera</i> Michx.	80	<1	NA	NA
AGPU	<i>Agrimonia pubescens</i> Wallr.	83	<1	NA	NA
DUIN	<i>Duchesnea indica</i> (Andrews) Focke	83	<1	NA	NA
OSLO	<i>Osmorhiza longistylis</i> (Torr.) DC.	83	<1	NA	NA
AMAR3	<i>Amelanchier arborea</i> (Michx. f.) Fernald	87	NA	NA	0.04

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CAPL5	<i>Carex platyphylla</i> Carey	89	<1	NA	NA
LACO3	<i>Lapsana communis</i> L.	89	<1	NA	NA
POAL3	<i>Poa alsodes</i> A. Gray	89	<1	NA	NA
RUAR2	<i>Rubus argutus</i> Link	89	<1	NA	NA
VISO	<i>Viola sororia</i> Willd.	89	<1	NA	NA
ELUM	<i>Elaeagnus umbellata</i> Thunb.	94	<1	NA	0
ACRA7	<i>Actaea racemosa</i> L.	95	<1	NA	NA
ACVI	<i>Acalypha virginica</i> L.	95	<1	NA	NA
CETE	<i>Celtis tenuifolia</i> Nutt.	95	<1	NA	NA
DENU4	<i>Desmodium nudiflorum</i> (L.) DC.	95	<1	NA	NA
DIBO2	<i>Dichanthelium boscii</i> (Poir.) Gould & C.A. Clark	95	<1	NA	NA
ULAM	<i>Ulmus americana</i> L.	100	NA	NA	0.03
FRPE	<i>Fraxinus pennsylvanica</i> Marshall	102	NA	NA	0.02
QUCO2	<i>Quercus coccinea</i> Münchh.	103	NA	NA	0.02
GASP5	<i>Galearis spectabilis</i> (L.) Raf.	104	<1	NA	NA
GLHE2	<i>Glechoma hederacea</i> L.	104	<1	NA	NA
MECA3	<i>Menispermum canadense</i> L.	104	<1	NA	NA
PIPU2	<i>Pilea pumila</i> (L.) A. Gray	104	<1	NA	NA
PATO2	<i>Paulownia tomentosa</i> (Thunb.) Siebold & Zucc. ex Staud.	108	NA	NA	0.02
ACNE2	<i>Acer negundo</i> L.	110	<1	NA	0
QUFA	<i>Quercus falcata</i> Michx.	111	NA	NA	0.02
AIAL	<i>Ailanthus altissima</i> (Mill.) Swingle	112	<1	NA	0.01
BETH	<i>Berberis thunbergii</i> DC.	113	<1	NA	0
CAAP5	<i>Carex appalachica</i> J. Webber & P.W. Ball	114	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CAMU4	<i>Carex muehlenbergii</i> Schkuhr ex Willd.	114	<1	NA	NA
CRCA9	<i>Cryptotaenia canadensis</i> (L.) DC.	114	<1	NA	NA
EUPU21	<i>Eutrochium purpureum</i> (L.) E.E. Lamont	114	<1	NA	NA
LYCI	<i>Lysimachia ciliata</i> L.	114	<1	NA	NA
MOFI	<i>Monarda fistulosa</i> L.	114	<1	NA	NA
MUSO	<i>Muhlenbergia sobolifera</i> (Muhl. ex Willd.) Trin.	114	<1	NA	NA
OXDI2	<i>Oxalis dillenii</i> Jacq.	114	<1	NA	NA
THTH2	<i>Thalictrum thalictroides</i> (L.) Eames & B. Boivin	114	<1	NA	NA
DIVI5	<i>Diospyros virginiana</i> L.	123	<1	NA	0
JUCI	<i>Juglans cinerea</i> L.	124	NA	NA	0.01
PIVI2	<i>Pinus virginiana</i> Mill.	125	NA	NA	0.01
ACPL	<i>Acer platanoides</i> L.	126	NA	NA	0.01
AGAL5	<i>Ageratina altissima</i> (L.) R.M. King & H. Rob.	127	<1	NA	NA
CAAL27	<i>Carya tomentosa</i> (Lam.) Nutt.	127	<1	NA	NA
CARYA	<i>Carya</i> sp.	127	<1	NA	NA
DAGL	<i>Dactylis glomerata</i> L.	127	<1	NA	NA
ELPU2	<i>Elaeagnus pungens</i> Thunb.	127	<1	NA	NA
ERHI2	<i>Erechtites hieraciifolia</i> (L.) Raf. ex DC.	127	<1	NA	NA
HULU	<i>Humulus lupulus</i> L.	127	<1	NA	NA
MARA7	<i>Maianthemum racemosum</i> (L.) Link	127	<1	NA	NA
MEOF2	<i>Melissa officinalis</i> L.	127	<1	NA	NA
RARE2	<i>Ranunculus recurvatus</i> Poir.	127	<1	NA	NA
SYMPH4	<i>Symphyotrichum</i> sp.	127	<1	NA	NA
PIPU	<i>Picea pungens</i> Engelm.	139	NA	NA	0.01

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CHVI3	<i>Chionanthus virginicus</i> L.	140	NA	NA	0
CADE12	<i>Castanea dentata</i> (Marshall) Borkh.	141	NA	NA	0
QUMU	<i>Quercus muehlenbergii</i> Engelm.	142	NA	NA	0
ILVE	<i>Ilex verticillata</i> (L.) A. Gray	144	NA	NA	0
COAL2	<i>Cornus alternifolia</i> L. f.	146	NA	NA	0
SANIC4	<i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli	147	NA	NA	0
RUAL	<i>Rubus allegheniensis</i> Porter	148	NA	NA	0
COAM3	<i>Corylus americana</i> Walter	149	NA	NA	0
CRPR2	<i>Crataegus pruinosa</i> (Wendl. f.) K. Koch	150	NA	NA	0
VIRE7	<i>Viburnum recognitum</i> Fernald	151	NA	NA	0
RUPE3	<i>Rubus pensilvanicus</i> Poir.	152	NA	NA	0
PRPE3	<i>Prunus persica</i> (L.) Batsch	154	NA	NA	NA

Note: Mean canopy area is collected for shrubs. Mean area at breast height (ABH) is collected for trees. Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov).

Table 9: Per plot breakdown of species richness, diversity, and herbaceous cover at SCBI.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
1189	11	2.13	22
1317	22	2.55	77
1573	12	2.22	29
16421	27	2.71	156
1829	34	2.78	167
2085	26	2.55	160
2147	11	2.05	34
2341	18	2.53	55
25573	37	2.75	159
2597	16	2.52	31

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
29157	51	3.39	235
33317	16	2.32	39
36837	33	2.68	135
42981	30	2.52	87
44773	35	2.91	184
64293	15	2.28	50
64485	23	2.19	126
741	38	3.12	200
7717	16	1.83	160
99	19	2.37	55

Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot.

4.4 Beetles

4.4.1 Site-Specific Methods

Beetle site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data was collected to start site level teaching collections. All beetle samples were pooled before being sent for identification. For DNA sequence data generated as a result of these efforts, visit the Barcode of Life Datasystems (BOLD) at <http://www.boldsystems.org>. For more information on this protocol and data product numbers see Appendix A.

4.4.2 Results

Table 10: Beetle identification results at SCBI.

Sample ID	Scientific Name	Sex
NEONTcarabid8125	<i>Galerita bicolor</i>	U
NEONTcarabid8126	<i>Galerita bicolor</i>	U
NEONTcarabid8127	<i>Galerita bicolor</i>	U
NEONTcarabid8128	<i>Galerita bicolor</i>	U
NEONTcarabid8129	<i>Dicaelus elongatus</i>	F
NEONTcarabid8130	<i>Poecilus lucublandus</i>	U
NEONTcarabid8131	<i>Poecilus lucublandus</i>	U
NEONTcarabid8132	<i>Chlaenius aestivus</i>	M

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Sample ID	Scientific Name	Sex
NEONTcarabid8133	<i>Poecilus lucublandus</i>	M
NEONTcarabid8134	<i>Poecilus lucublandus</i>	U
NEONTcarabid8135	<i>Poecilus lucublandus</i>	U
NEONTcarabid8136	<i>Amara aenea</i>	M
NEONTcarabid8137	<i>Amara impuncticollis</i>	F
NEONTcarabid8138	<i>Trichotichnus fulgens</i>	F
NEONTcarabid8139	<i>Trichotichnus fulgens</i>	M

4.5 Mosquitoes

4.5.1 Site-Specific Methods

Mosquito site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]) to test protocol methods and start site level species lists. All mosquitoes were pooled before being sent for identification. No pathogen testing was performed. For more information on this protocol and data product numbers see Appendix A.

4.5.2 Results

Table 11: Mosquito identification results at SCBI.

Sample ID	Scientific Name	Individual Count
SCBI.May2013.SC.1	<i>Culex restuans</i>	54

4.6 Ticks

4.6.1 Site-Specific Methods

Tick drags were conducted in June 2013 to test protocol methods and calculate capture rates. All tick samples were pooled before being sent for identification. No pathogen testing was performed. For more information on this protocol and data product numbers see Appendix A.

4.6.2 Results

Table 12: Tick identification results at SCBI.

Sample ID	Scientific Name	Number Adult Male	Number of Adult Females	Number of Nymphs
SCBI_000.20130528.SC.1	<i>Ixodes scapularis</i>	0	0	3
SCBI_000.20130528.SC.1	<i>Amblyomma americanum</i>	7	4	4

4.7 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]).

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. ZooKeys, (245), 1-1722.

Bourg, N.A., W.J. McShea, J.R. Thompson, J.C. McGarvey, and X. Shen. 2013. Initial census, woody seedling, seed rain, and stand structure data for the SCBI SIGEO Large Forest Dynamics Plot. Ecology 94(9): 2111-2112.

Cass, W. B., W. W. Hochstedler, and A. B. Williams. 2012. "Forest Vegetation Status in Shenandoah National Park Long-Term Ecological Monitoring Summary Report 2003-2011." Natural Resource Data Series NPS/MIDN/NRDS 353.

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic/_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

Mitchell, Joseph C., Sherry C. Rinehart, John F. Pagels, Kurt A. Buhlmann, and Christopher A. Pague. 1997. "Factors Influencing Amphibian and Small Mammal Assemblages in Central Appalachian Forests." Forest Ecology and Management 96: 65-76.

Virginia Department of Game & Inland Fisheries. (2016). Wildlife Information. Retrieved from <http://www.dgif.virginia.gov/wildlife/information>

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5 RELOCATABLE SITE 1- SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER (SERC)

The Smithsonian Environmental Research Center (SERC) includes a wide variety of terrestrial, wetland, and estuarine habitats. The site is indicative of coastal hardwood forests in the Middle Atlantic Domain.

Key Characteristics:

- Site host: Smithsonian Institution
- Located in: Anne Arundel county, Maryland
- TOS Sampling Area: 10.27 km²
- Elevation: -2-45m
- Dominant vegetation type: Dominant tree species include yellow poplar (*Liriodendron tulipifera*), American beech (*Fagus grandifolia*), and American sweetgum (*Liquidambar styraciflua*).
- General management: Selective logging occurs at the north end of the property. The majority of the forest in the property is well preserved for research use.
- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

5.1 TOS Spatial Sampling Design

TOS plots were allocated at SERC according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

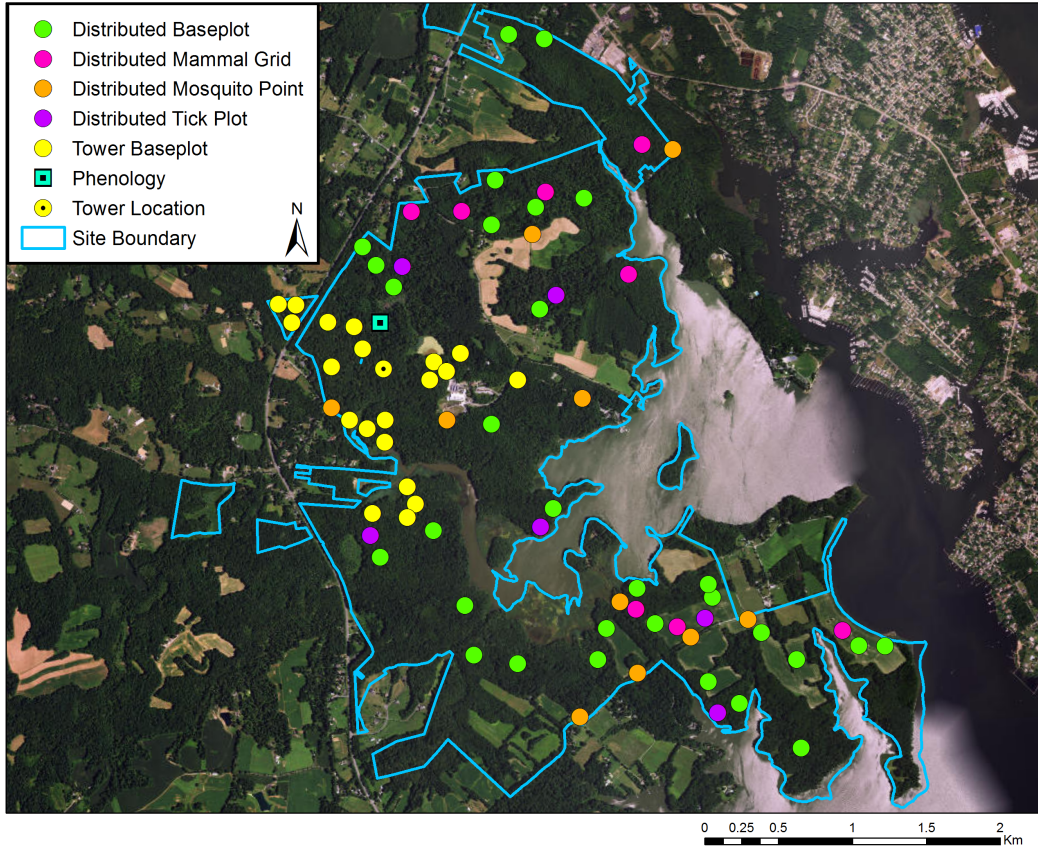


Figure 6: Map of TOS plot centroids within the NEON TOS sampling boundary at SERC.

For a list of protocols associated with each plot see tables below; for additional spatial design information see RD[03].

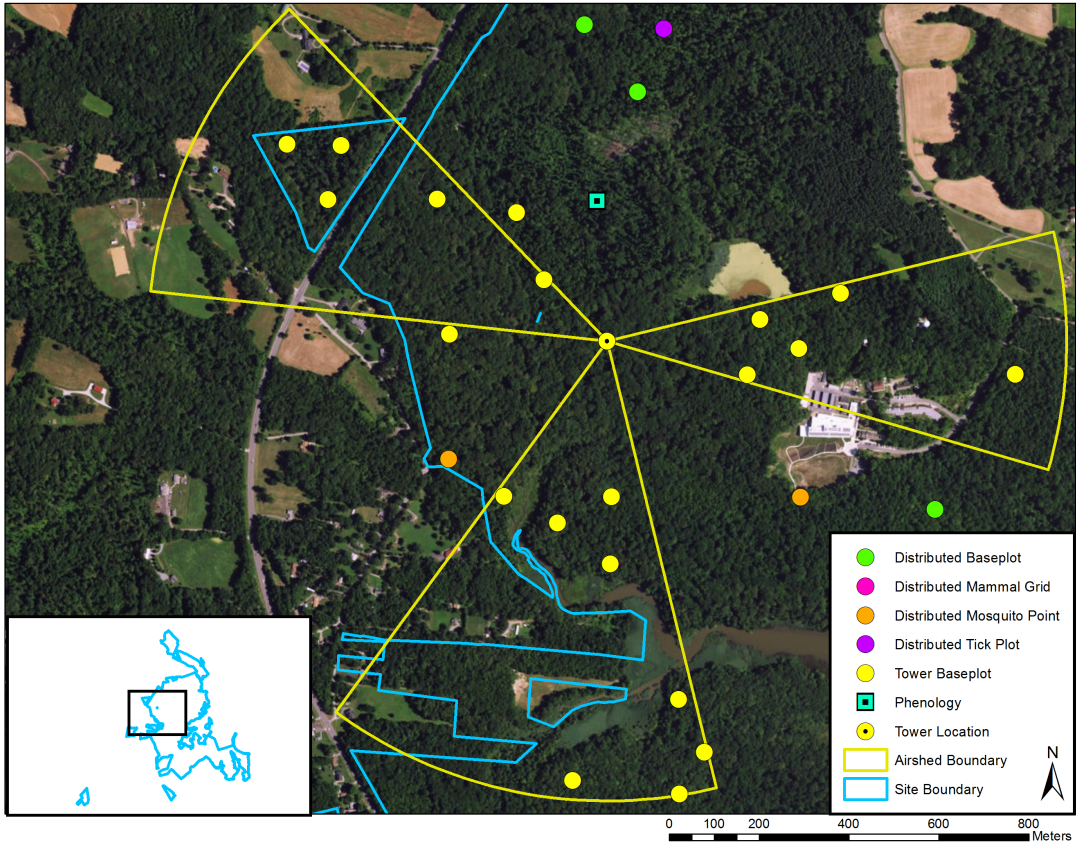


Figure 7: Map of the tower airshed and TOS plot centroids at SERC.

More information about the tower airshed can be found in the FIU site characterization report (RD[04]).

Table 13: NLCD land cover classes and area within the TOS site boundary at SERC.

NLCD Class	Site Area (km ²)	Percent (%)
Deciduous Forest	4.68	44.57
Woody Wetlands	2.76	26.3
Cultivated Crops	0.95	9.08
Emergent Herbaceous Wetlands	0.59	5.62
Pasture Hay	0.44	4.16
Developed Open Space	0.3	2.89
Open Water	0.3	2.81
Mixed Forest	0.21	1.99
Evergreen Forest	0.16	1.53
Shrub Scrub	0.09	0.88
Developed Low Intensity	0.02	0.15

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 14: NLCD land cover classes and TOS plot numbers at SERC.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Cultivated Crops	9
Distributed	Base Plot	Deciduous Forest	21
Distributed	Mammal Grid	Deciduous Forest	6
Distributed	Mammal Grid	Cultivated Crops	2
Distributed	Mosquito Point	Cultivated Crops	2
Distributed	Mosquito Point	Deciduous Forest	8
Distributed	Tick Plot	Cultivated Crops	1
Distributed	Tick Plot	Deciduous Forest	5
Tower	Base Plot	NA	20
Tower	Phenology Plot	NA	1

Note: NLCD land cover classes are not used to stratify Tower Plots.

Table 15: Number of Distributed Base plots per NLCD land cover class per protocol at SERC.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Cultivated Crops	Beetles	1

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Beetles	9
Distributed	Base Plot	Cultivated Crops	Birds	5
Distributed	Base Plot	Deciduous Forest	Birds	20
Distributed	Base Plot	Cultivated Crops	Canopy Foliage Chemistry	2
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	8
Distributed	Base Plot	Cultivated Crops	Coarse Downed Wood	3
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	17
Distributed	Base Plot	Cultivated Crops	Digital Hemispherical Photos for Leaf Area Index	3
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	17
Distributed	Base Plot	Cultivated Crops	Herbaceous Biomass	3
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	17
Distributed	Base Plot	Cultivated Crops	Plant Diversity	9
Distributed	Base Plot	Deciduous Forest	Plant Diversity	21
Distributed	Base Plot	Cultivated Crops	Soil Biogeochemistry	1
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	5
Distributed	Base Plot	Cultivated Crops	Soil Microbes	1
Distributed	Base Plot	Deciduous Forest	Soil Microbes	5
Distributed	Base Plot	Cultivated Crops	Vegetation Structure	3
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	17

Note: Distributed Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Distributed Base Plot number.

Table 16: Number of Tower Plots per protocol at SERC.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Below Ground Biomass Coring	20
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	20
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	20
Tower	Base Plot	Herbaceous Biomass	20
Tower	Base Plot	Litterfall and Fine Woody Debris	20
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	20
Tower	Phenology	Plant Phenology	1

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Tower Base Plot number.

5.2 Belowground Biomass

5.2.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 180 cm by NEON staff in May 2014. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 4 mm and 4-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to 30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

5.2.2 Results

Table 17: Fine root mass per depth increment (cm) at SERC.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	3.66	2.1
10	20	4.04	1.76
20	30	1.05	1.28
30	40	1.62	0.68
40	50	0.67	0.67
50	60	0.09	0.08
60	70	0.85	1.19
70	80	0.41	0.47
80	90	0.15	0.11
90	100	0.17	0.17
100	120	0.07	0.05

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Upper Depth	Lower Depth	Mean (mg per cm³)	Std Dev
120	140	0.05	0.03
140	160	0.04	0.04
160	180	0.07	0.04

Table 18: Cumulative fine root mass as a function of depth (cm) at SERC.

Upper Depth	Lower Depth	Mean Cumulative (g per m²)	Cumulative Std Dev
0	10	366.41	210.46
10	20	769.99	68.32
20	30	874.76	66.2
30	40	1036.67	30.89
40	50	1103.22	52.21
50	60	1112.59	51.38
60	70	1197.18	154.65
70	80	1238.11	135.28
80	90	1253.4	129.07
90	100	1270.2	124.56
100	120	1283.77	114.88
120	140	1294.5	110.29
140	160	1303.47	112.15
160	180	1316.83	108.98

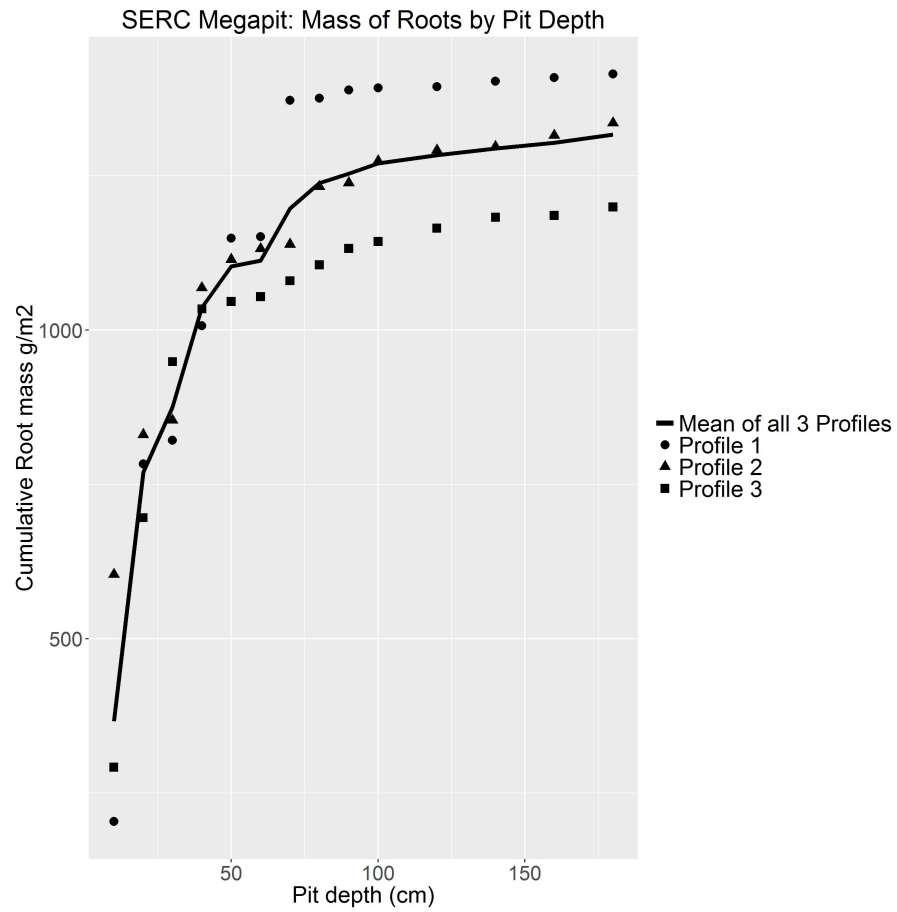


Figure 8: Cumulative root mass by pit depth at SERC.

Table 19: Fine root biomass sampling summary data at SERC.

Total Pit Depth (cm)	180
Total Cumulative Mass at 30cm (g per m ²)	874.76
Total Cumulative Mass at 100cm (g per m ²)	1270.2
Total Cumulative Mass (g per m ²)	1316.83

5.3 Plant Characterization and Phenology Species Selection

5.3.1 Site-Specific Methods

Plant characterization data were collected by NEON staff during June of 2015 following the standard methods outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A.

5.3.2 Results

Table 20: Site plant characterization and phenology species summary at SERC.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
LITU	<i>Liriodendron tulipifera</i> L.	1	1	NA	12.39
FAGR	<i>Fagus grandifolia</i> Ehrh.	2	4	0.029	3.85
LIST2	<i>Liquidambar styraciflua</i> L.	3	<1	0.007	5.94
LIBE3	<i>Lindera benzoin</i> (L.) Blume	4	3	0.024	0.04
ILOP	<i>Ilex opaca</i> Aiton	5	<1	0.001	0.04
QUAL	<i>Quercus alba</i> L.	6	<1	NA	1.8
ACRU	<i>Acer rubrum</i> L.	7	<1	NA	1.32
CACA18	<i>Carpinus caroliniana</i> Walter	8	2	NA	0.25
KALA	<i>Kalmia latifolia</i> L.	9	<1	0.017	0.07
NYSY	<i>Nyssa sylvatica</i> Marshall	10	<1	NA	1.05
QURU	<i>Quercus rubra</i> L.	11	<1	NA	0.92
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	12	<1	NA	0.7
CATO6	<i>Carya tomentosa</i> (Lam.) Nutt.	13	<1	NA	0.69
QUVE	<i>Quercus velutina</i> Lam.	15	<1	NA	0.59
LOJA	<i>Lonicera japonica</i> Thunb.	16	2	NA	0
FRAM2	<i>Fraxinus americana</i> L.	17	<1	NA	0.21
AMELA	<i>Amelanchier</i> sp.	18	<1	0.007	0.03
QUMO4	<i>Quercus montana</i> Willd.	19	NA	NA	0.43
ROMU	<i>Rosa multiflora</i> Thunb.	20	1	NA	0
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	21	<1	NA	0
ACNE2	<i>Acer negundo</i> L.	22	<1	NA	0.28
PLOC	<i>Platanus occidentalis</i> L.	23	NA	NA	0.27
ARTR	<i>Arisaema triphyllum</i> (L.) Schott	24	<1	NA	NA
QUFA	<i>Quercus falcata</i> Michx.	25	<1	NA	0.22
RUPH	<i>Rubus phoenicolasius</i> Maxim.	26	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
BETH	<i>Berberis thunbergii</i> DC.	27	<1	NA	NA
MIVI	<i>Microstegium vimineum</i> (Trin.) A. Camus	28	<1	NA	NA
LEVI2	<i>Leersia virginica</i> Willd.	29	<1	NA	NA
VIOLA	<i>Viola</i> sp.	30	<1	NA	NA
CARYA	<i>Carya</i> sp.	31	<1	NA	0.01
QUERC	<i>Quercus</i> sp.	32	<1	NA	0.18
POAC4	<i>Polystichum acrostichoides</i> (Michx.) Schott	33	<1	NA	NA
POPE	<i>Podophyllum peltatum</i> L.	34	<1	NA	NA
PIVI2	<i>Pinus virginiana</i> Mill.	35	NA	NA	0.13
ULMUS	<i>Ulmus</i> sp.	36	<1	NA	0.11
DUIN	<i>Duchesnea indica</i> (Andrews) Focke	37	<1	NA	NA
MIRE	<i>Mitchella repens</i> L.	38	<1	NA	NA
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	39	<1	NA	0.01
CIAR2	<i>Cinna arundinacea</i> L.	40	<1	NA	NA
VITIS	<i>Vitis</i> sp.	41	<1	NA	0.03
BOCY	<i>Boehmeria cylindrica</i> (L.) Sw.	42	<1	NA	NA
VIAC	<i>Viburnum acerifolium</i> L.	43	<1	NA	NA
VACO	<i>Vaccinium corymbosum</i> L.	44	<1	NA	0
COFL2	<i>Cornus florida</i> L.	45	<1	NA	0.04
2PLANT	Unknown plant	46	<1	NA	NA
VACCI	<i>Vaccinium</i> sp.	47	<1	NA	NA
GECA7	<i>Geum canadense</i> Jacq.	48	<1	NA	NA
PRSE2	<i>Prunus serotina</i> Ehrh.	49	<1	NA	0.02
AMBR2	<i>Amphicarpaea bracteata</i> (L.) Fernald	50	<1	NA	NA
VIPR	<i>Viburnum prunifolium</i> L.	51	<1	NA	NA
QUMA3	<i>Quercus marilandica</i> Münchh.	52	<1	NA	0.05
SMRO	<i>Smilax rotundifolia</i> L.	53	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
GAAP2	<i>Galium aparine</i> L.	54	<1	NA	NA
DIVI5	<i>Diospyros virginiana</i> L.	55	NA	NA	0.05
EUAM9	<i>Euonymus americanus</i> L.	56	<1	NA	NA
CYVI	<i>Cynoglossum virginianum</i> L.	57	<1	NA	NA
ASTR	<i>Asimina triloba</i> (L.) Dunal	58	<1	NA	0
CASW	<i>Carex swanii</i> (Fernald) Mack.	59	<1	NA	NA
OSCL	<i>Osmorhiza claytonii</i> (Michx.) C.B. Clarke	59	<1	NA	NA
PATO2	<i>Paulownia tomentosa</i> (Thunb.) Siebold & Zucc. ex Steud.	61	NA	NA	0.04
CAREX	<i>Carex</i> sp.	62	<1	NA	NA
SACA15	<i>Sanicula canadensis</i> L.	63	<1	NA	NA
RUBUS	<i>Rubus</i> sp.	64	<1	NA	NA
PRAV	<i>Prunus avium</i> (L.) L.	65	<1	NA	0.03
GACI2	<i>Galium circaezans</i> Michx.	66	<1	NA	NA
CEOR7	<i>Celastrus orbiculatus</i> Thunb.	67	<1	NA	0
CADE12	<i>Castanea dentata</i> (Marshall) Borkh.	68	NA	NA	0.03
SAAL5	<i>Sassafras albidum</i> (Nutt.) Nees	69	<1	NA	0.02
JUVI	<i>Juniperus virginiana</i> L.	70	NA	NA	0.02
POACEA	Poaceae sp.	71	<1	NA	NA
POVI2	<i>Polygonum virginianum</i> L.	71	<1	NA	NA
ROPS	<i>Robinia pseudoacacia</i> L.	73	NA	NA	0.02
BENI	<i>Betula nigra</i> L.	74	NA	NA	0.02
BOVI	<i>Botrychium virginianum</i> (L.) Sw.	75	<1	NA	NA
CILUC	<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Asch. & Magnus	75	<1	NA	NA
HEHE	<i>Hedera helix</i> L.	77	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
POAR6	<i>Polygonum arifolium</i> L.	78	<1	NA	NA
ARSP2	<i>Aralia spinosa</i> L.	79	<1	NA	NA
CARA2	<i>Campsis radicans</i> (L.) Seem. ex Bureau	80	<1	NA	NA
IMCA	<i>Impatiens capensis</i> Meerb.	80	<1	NA	NA
SOLID	<i>Solidago</i> sp.	80	<1	NA	NA
ONSE	<i>Onoclea sensibilis</i> L.	83	<1	NA	NA
CALU5	<i>Carex lurida</i> Wahlenb.	84	<1	NA	NA
FESU3	<i>Festuca subverticillata</i> (Pers.) Alexeev	84	<1	NA	NA
LYCOP2	<i>Lycopodium</i> sp.	84	<1	NA	NA
ALPE4	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	87	<1	NA	NA
CHMA3	<i>Chimaphila maculata</i> (L.) Pursh	87	<1	NA	NA
CRATA	<i>Crataegus</i> sp.	87	<1	NA	NA
DESMO	<i>Desmodium</i> sp.	87	<1	NA	NA
PHLE5	<i>Phryma leptostachya</i> L.	87	<1	NA	NA
CILU	<i>Circaea lutetiana</i> L.	92	<1	NA	NA
EPVI2	<i>Epifagus virginiana</i> (L.) W.P.C. Barton	92	<1	NA	NA
VIDE	<i>Viburnum dentatum</i> L.	92	<1	NA	NA
KALMI	<i>Kalmia</i> sp.	95	NA	NA	0
ASTERA	Asteraceae sp.	96	<1	NA	NA
LIGUS2	<i>Ligustrum</i> sp.	96	<1	NA	NA
MARA7	<i>Maianthemum racemosum</i> (L.) Link	96	<1	NA	NA
BODI2	<i>Botrychium dissectum</i> Spreng.	99	<1	NA	NA
OXALI	<i>Oxalis</i> sp.	99	<1	NA	NA
POBI2	<i>Polygonatum biflorum</i> (Walter) Elliott	99	<1	NA	NA
ACNEN	<i>Acer negundo</i> L. var. <i>negundo</i>	102	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CARDA	<i>Cardamine</i> sp.	102	<1	NA	NA
OPVU	<i>Ophioglossum vulgatum</i> L.	102	<1	NA	NA
POACEASPP	Poaceae sp.	102	<1	NA	NA
PRAL7	<i>Prunus alabamensis</i> C. Mohr	102	<1	NA	NA
QUERCSP	<i>Quercus</i> sp.	102	<1	NA	NA
CARA8	<i>Carex radiata</i> (Wahlenb.) Small	108	<1	NA	NA
EUDI16	<i>Eurybia divaricata</i> (L.) G.L. Nesom	108	<1	NA	NA
GALIU	<i>Galium</i> sp.	108	<1	NA	NA
GAOB	<i>Galium obtusum</i> Bigelow	108	<1	NA	NA
GOPU	<i>Goodyera pubescens</i> (Willd.) R. Br.	108	<1	NA	NA
LAMIAC	Lamiaceae sp.	108	<1	NA	NA
MYMA	<i>Myosotis macrosperma</i> Engelm.	108	<1	NA	NA
OPPU3	<i>Ophioglossum pusillum</i> Raf.	108	<1	NA	NA
PINUS	<i>Pinus</i> sp.	108	<1	NA	NA
POA	<i>Poa</i> sp.	108	<1	NA	NA
POPE10	<i>Polygonum perfoliatum</i> L.	108	<1	NA	NA
PRUNU	<i>Prunus</i> sp.	108	<1	NA	NA
RAAB	<i>Ranunculus abortivus</i> L.	108	<1	NA	NA
RARE2	<i>Ranunculus recurvatus</i> Poir.	108	<1	NA	NA
VISA	<i>Vicia sativa</i> L.	108	<1	NA	NA
CACO15	<i>Carya cordiformis</i> (Wangenh.) K. Koch	123	NA	NA	0
AIAL	<i>Ailanthus altissima</i> (Mill.) Swingle	124	NA	NA	NA

Note: Mean canopy area is collected for shrubs. Mean area at breast height (ABH) is collected for trees. Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov).

Table 21: Per plot breakdown of species richness, diversity, and herbaceous cover at SERC.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
SERC_043	46	3.25	111
SERC_044	28	2.62	51
SERC_045	32	3.31	24
SERC_046	21	2.67	28
SERC_047	31	2.18	97
SERC_048	34	2.66	92
SERC_049	27	2.66	49
SERC_050	21	2.12	35
SERC_051	13	1.62	44
SERC_052	30	2.8	87
SERC_053	38	2.38	138
SERC_054	26	2.84	32
SERC_055	36	3.18	76
SERC_056	35	2.58	90
SERC_057	21	1.95	62
SERC_058	33	2.7	83
SERC_059	37	2.73	134
SERC_060	31	2.87	87
SERC_061	42	2.69	136
SERC_062	35	2.28	158

Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot.

5.4 Beetles

5.4.1 Site-Specific Methods

Beetle site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data was collected to start site level teaching collections. All beetle samples were pooled before being sent for identification. For DNA sequence data generated as a result of these efforts, visit the Barcode of Life Datasystems (BOLD) at <http://www.boldsystems.org>. For more information on this protocol and data product numbers see Appendix A.

5.4.2 Results

Table 22: Beetle identification results at SERC.

Sample ID	Scientific Name	Sex
NEONTcarabid8125	<i>Galerita bicolor</i>	U
NEONTcarabid8126	<i>Galerita bicolor</i>	U
NEONTcarabid8127	<i>Galerita bicolor</i>	U
NEONTcarabid8128	<i>Galerita bicolor</i>	U
NEONTcarabid8129	<i>Dicaelus elongatus</i>	F
NEONTcarabid8130	<i>Poecilus lucublandus</i>	U
NEONTcarabid8131	<i>Poecilus lucublandus</i>	U
NEONTcarabid8132	<i>Chlaenius aestivus</i>	M
NEONTcarabid8133	<i>Poecilus lucublandus</i>	M
NEONTcarabid8134	<i>Poecilus lucublandus</i>	U
NEONTcarabid8135	<i>Poecilus lucublandus</i>	U
NEONTcarabid8136	<i>Amara aenea</i>	M
NEONTcarabid8137	<i>Amara impuncticollis</i>	F
NEONTcarabid8138	<i>Trichotichnus fulgens</i>	F
NEONTcarabid8139	<i>Trichotichnus fulgens</i>	M

5.5 Mosquitoes

5.5.1 Site-Specific Methods

Mosquito site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]) to test protocol methods and start site level species lists. All mosquitoes were pooled before being sent for identification. No pathogen testing was performed. For more information on this protocol and data product numbers see Appendix A.

5.5.2 Results

Table 23: Mosquito identification results at SERC.

Sample ID	Scientific Name	Individual Count
SERC.20140721.SC.1	<i>Aedes canadensis</i>	1
SERC.20140721.SC.1	<i>Aedes cantator</i>	1
SERC.20140721.SC.1	<i>Aedes vexans</i>	2
SERC.20140721.SC.1	<i>Anopheles quadrimaculatus</i>	3
SERC.20140721.SC.1	<i>Culex salinarius</i>	155

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Sample ID	Scientific Name	Individual Count
SERC.20140721.SC.1	<i>Culex species</i>	1
SERC.20140721.SC.1	<i>Anopheles crucians complex</i>	49

5.6 Ticks

5.6.1 Site-Specific Methods

Tick drags were conducted in June 2013 to test protocol methods and calculate capture rates. All tick samples were pooled before being sent for identification. No pathogen testing was performed. For more information on this protocol and data product numbers see Appendix A.

5.6.2 Results

Table 24: Tick identification results at SERC.

Sample ID	Scientific Name	Number Adult Male	Number of Adult Females	Number of Nymphs
SERC_000.20140702.SC.1	<i>Dermacentor variabilis</i>	0	1	0
SERC_000.20140702.SC.1	<i>Amblyomma americanum</i>	0	0	1

5.7 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]). See the SCBI species reference list section for statewide resources.

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. ZooKeys, (245), 1-1722.

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic/_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

Perry, Matthew C., Peter C. Osenton, and Cindy S. Stoll.(1998) "Biological Diversity of Created Forested Wetlands in Comparison to Reference Forested Wetlands in the Bay Watershed". In G.Therres, M.lattery, and E. Deems(Eds.),Paper presented at The Conservation of Biological Diversity: A Key to the Restoration of the Chesapeake Bay Ecosystem and Beyond Conference, Annapolis, Maryland (pp.261-68). Maryland Department of Natural Resources.

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6 RELOCATABLE SITE 2- BLANDY EXPERIMENTAL FARM (BLAN)

The Blandy Experimental Farm contains several land use types typically found in rural-suburban landscapes. This mix of woodland, successional fields, pastures, and small ponds is typical and representative in the Middle Atlantic Domain. This site will be under increasing ecological pressure from urbanization within the rapidly growing megapolitan area.

The Blandy Experimental Farm property was too small for NEON’s Distributed Plot activities and additional land at Casey Tree Farm 10 kms northeast of the tower was selected for Distributed Plot sampling. The Casey Tree Farm site is also a mix of woodland, hay fields, and tree nurseries.

Key Characteristics:

- Site host: University of Virginia and Casey Trees
- Located in: Clarke county, Virginia
- Area: Blandy Experimental Farm- 2.69km², Casey Tree Farm- 3.03km²
- Elevation: 115-195m
- Dominant vegetation type- The Blandy site is dominated by fallow scrubland. Goldenrod (*Solidago altissima*) and hay crops are two of the dominant vegetation types. Successional shrubs and fragmented secondary forests surround the site. The Casey Tree Farm site includes a tree nursery and hay fields surrounded by deciduous woodland.
- General management: The mission of Blandy Experimental Farm is to increase understanding of the natural environment through research and education and is home to a vibrant research community. Casey Tree Farm was gifted to Casey Trees in 2008 as a site for tree nurseries and to enhance their core mission through research, collaboration, and environmental stewardship.
- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

6.1 TOS Spatial Sampling Design

TOS plots were allocated at BLAN according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

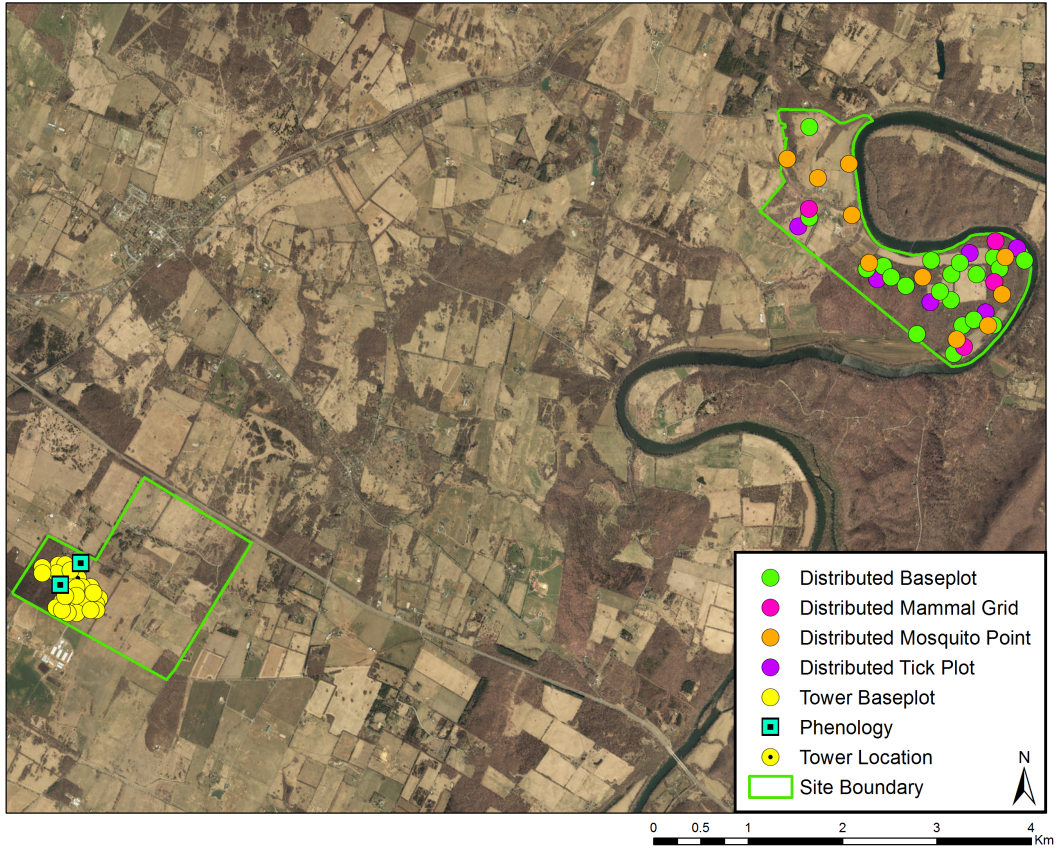


Figure 9: Map of TOS plot centroids within the NEON TOS sampling boundary at BLAN.

For a list of protocols associated with each plot see tables below; for additional spatial design information see RD[03].

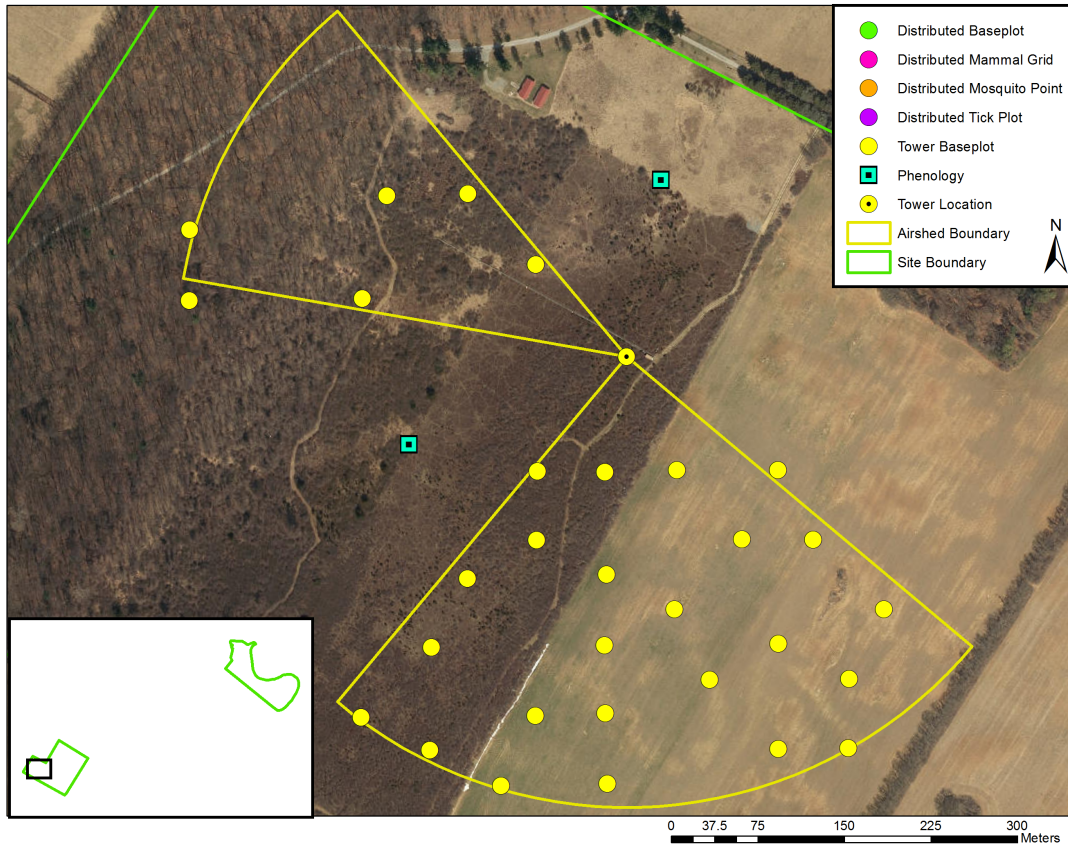


Figure 10: Map of the tower airshed and TOS plot centroids at BLAN.

More information about the tower airshed can be found in the TIS site characterization report (RD[04]).

Table 25: NLCD land cover classes and area within the TOS site boundary at BLAN.

NLCD Class	Site Area (km ²)	Percent (%)
Deciduous Forest	1.55	50.83
Pasture Hay	1.23	40.36
Developed Open Space	0.17	5.68
Open Water	0.04	1.3
Evergreen Forest	0.03	0.92
Mixed Forest	0.02	0.59
Woody Wetlands	0.01	0.33

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 26: NLCD land cover classes and TOS plot numbers at BLAN.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Cultivated Crops	9
Distributed	Base Plot	Deciduous Forest	21
Distributed	Mammal Grid	Deciduous Forest	6
Distributed	Mammal Grid	Cultivated Crops	2
Distributed	Mosquito Point	Cultivated Crops	2
Distributed	Mosquito Point	Deciduous Forest	8
Distributed	Tick Plot	Cultivated Crops	1
Distributed	Tick Plot	Deciduous Forest	5
Tower	Base Plot	NA	20
Tower	Phenology Plot	NA	1

Note: NLCD land cover classes are not used to stratify Tower Plots.

Table 27: Number of Distributed Base plots per NLCD land cover class per protocol at BLAN.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Cultivated Crops	Beetles	1
Distributed	Base Plot	Deciduous Forest	Beetles	9
Distributed	Base Plot	Cultivated Crops	Birds	5
Distributed	Base Plot	Deciduous Forest	Birds	20
Distributed	Base Plot	Cultivated Crops	Canopy Foliage Chemistry	2
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	8
Distributed	Base Plot	Cultivated Crops	Coarse Downed Wood	3
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	17
Distributed	Base Plot	Cultivated Crops	Digital Hemispherical Photos for Leaf Area Index	3
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	17
Distributed	Base Plot	Cultivated Crops	Herbaceous Biomass	3
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	17
Distributed	Base Plot	Cultivated Crops	Plant Diversity	9
Distributed	Base Plot	Deciduous Forest	Plant Diversity	21
Distributed	Base Plot	Cultivated Crops	Soil Biogeochemistry	1
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	5

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Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Cultivated Crops	Soil Microbes	1
Distributed	Base Plot	Deciduous Forest	Soil Microbes	5
Distributed	Base Plot	Cultivated Crops	Vegetation Structure	3
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	17

Note: Distributed Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Distributed Base Plot number.

Table 28: Number of Tower Plots per protocol at BLAN.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Below Ground Biomass Coring	20
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	20
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	20
Tower	Base Plot	Herbaceous Biomass	20
Tower	Base Plot	Litterfall and Fine Woody Debris	20
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	20
Tower	Phenology	Plant Phenology	1

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Tower Base Plot number.

6.2 Belowground Biomass

6.2.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 180 cm by NEON staff in January 2013. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 2 mm and 2-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to

30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

6.2.2 Results

Table 29: Fine root mass per depth increment (cm) at BLAN.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	3.46	1.25
10	20	0.99	0.89
20	30	0.29	0.09
30	40	0.24	0.2
40	50	0.49	0.31
50	60	0.4	0.28
60	70	0.29	0.34
70	80	0.1	0.07
80	90	0.03	0.01
90	100	0.06	0.01
100	120	0.03	0.02
120	140	0.08	0.04
140	160	0.02	0.01
160	180	0.07	0.07

Table 30: Cumulative fine root mass as a function of depth (cm) at BLAN.

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
0	10	346.09	124.67
10	20	445.23	114.6
20	30	474.15	123.55
30	40	497.71	142.97
40	50	546.64	129.09
50	60	586.71	102.05
60	70	616.11	70.48
70	80	625.95	67.9
80	90	629.11	68.6
90	100	634.77	69.47

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
100	120	639.97	69.2
120	140	655.36	70.56
140	160	660.14	68.97
160	180	674.63	78.86

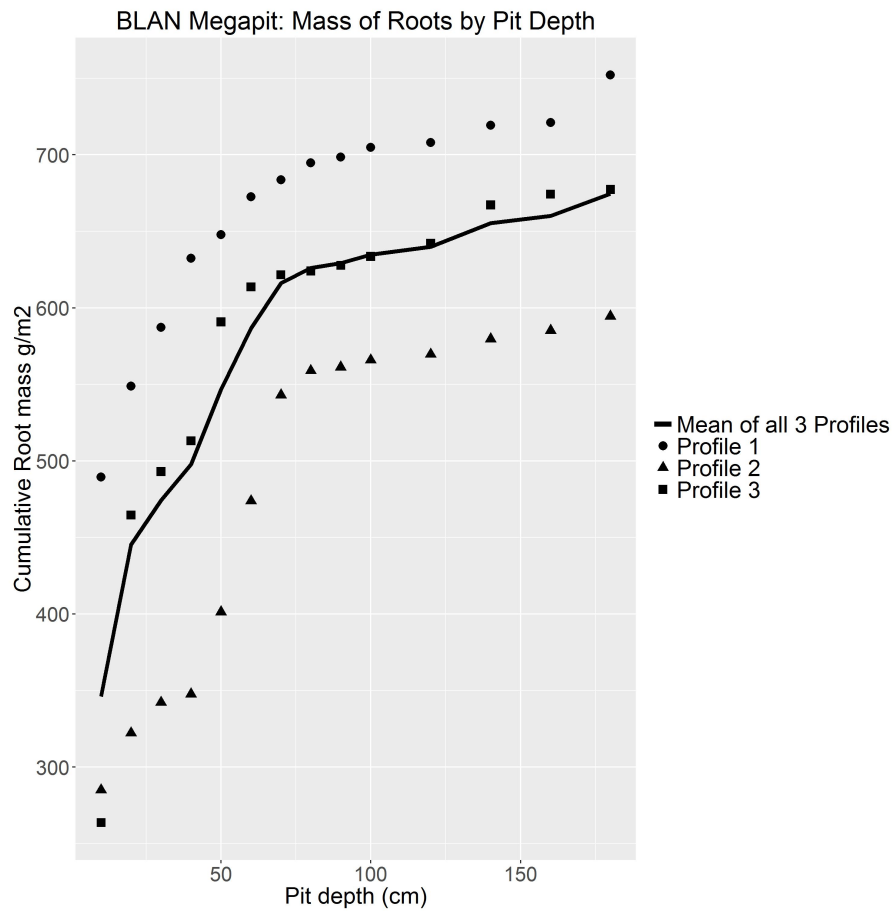


Figure 11: Cumulative root mass by pit depth at BLAN.

Table 31: Fine root biomass sampling summary data at BLAN.

Total Pit Depth (cm)	180
Total Cumulative Mass at 30cm (g per m ²)	474.15
Total Cumulative Mass at 100cm (g per m ²)	634.77
Total Cumulative Mass (g per m ²)	674.63

6.3 Plant Characterization and Phenology Species Selection

6.3.1 Site-Specific Methods

Plant characterization data were collected by NEON staff in June 2015 following the standard methods outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A.

6.3.2 Results

Table 32: Site plant characterization and phenology species summary at BLAN.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
RHDA	<i>Rhamnus davurica</i> Pall.	1	7	0.72	0.21
LOMA6	<i>Lonicera maackii</i> (Rupr.) Herder	2	<1	0.32	0.12
JUNI	<i>Juglans nigra</i> L.	3	<1	0.006	2.06
ZEMA	<i>Zea mays</i> L.	4	13	NA	NA
CEOC	<i>Celtis occidentalis</i> L.	5	<1	NA	1.49
QUAL	<i>Quercus alba</i> L.	6	NA	NA	0.84
LIBE3	<i>Lindera benzoin</i> (L.) Blume	7	<1	0.092	0.02
CEOR7	<i>Celastrus orbiculatus</i> Thunb.	8	3	NA	0.34
SOAL6	<i>Solidago altissima</i> L.	9	6	NA	NA
PIST	<i>Pinus strobus</i> L.	10	NA	NA	0.51
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	11	NA	NA	0.29
TEDA	<i>Tetradium daniellii</i> (Benn.) T.G. Hartley	13	<1	NA	0.15
TRITI	<i>Triticum</i> sp.	14	1	NA	NA
LOJA	<i>Lonicera japonica</i> Thunb.	15	<1	NA	0.04
AIAL	<i>Ailanthus altissima</i> (Mill.) Swingle	16	NA	NA	0.11
POLYG4	<i>Polygonum</i> sp.	17	<1	NA	NA
JUVIV	<i>Juniperus virginiana</i> L. var. <i>virginiana</i>	18	NA	NA	0.03
LOIN	<i>Lobelia inflata</i> L.	19	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
RHSC3	<i>Rhodotypos scandens</i> (Thunb.) Makino	20	<1	NA	NA
MIVI	<i>Microstegium vimineum</i> (Trin.) A. Camus	21	<1	NA	NA
BRIN2	<i>Bromus inermis</i> Leyss.	22	<1	NA	NA
PRUNUSPP	<i>Prunus</i> sp.	23	NA	NA	0.05
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	24	<1	NA	NA
ASTR	<i>Asimina triloba</i> (L.) Dunal	25	NA	NA	0.02
ANAR	<i>Anagallis arvensis</i> L.	26	<1	NA	NA
PRSES	<i>Prunus serotina</i> Ehrh. var. <i>serotina</i>	27	<1	NA	0.03
DUIN	<i>Duchesnea indica</i> (Andrews) Focke	28	<1	NA	NA
VITIS	<i>Vitis</i> sp.	29	<1	NA	0.02
ACNEN	<i>Acer negundo</i> L. var. <i>negundo</i>	30	NA	NA	NA
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	31	<1	NA	0.01
RUPH	<i>Rubus phoenicolasius</i> Maxim.	32	<1	NA	NA
ELYMU	<i>Elymus</i> sp.	33	<1	NA	NA
RUBUS	<i>Rubus</i> sp.	33	<1	NA	NA
OXALI	<i>Oxalis</i> sp.	35	<1	NA	NA
PRSES	<i>Prunus serotina</i> Ehrh. var. <i>serotina</i>	36	<1	NA	0.03
CILUC	<i>Circaea lutetiana</i> L. subsp. <i>canadensis</i> (L.) Asch. & Magnus	37	<1	NA	NA
FRAM2	<i>Fraxinus americana</i> L.	38	NA	NA	0.02
2PLANT	Unknown plant	39	<1	NA	NA
POACEA	Poaceae sp.	40	<1	NA	NA
ALPE4	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	41	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
SOHA	<i>Sorghum halepense</i> (L.) Pers.	42	<1	NA	NA
LISI	<i>Ligustrum sinense</i> Lour.	43	NA	0.002	NA
GAVE	<i>Galium verum</i> L.	44	<1	NA	NA
BROMU	<i>Bromus</i> sp.	45	<1	NA	NA
RUBUSSPP	<i>Rubus</i> sp.	45	<1	NA	NA
GLHE2	<i>Glechoma hederacea</i> L.	47	<1	NA	NA
IMCA	<i>Impatiens capensis</i> Meerb.	48	<1	NA	NA
POLYG4SPP	<i>Polygonum</i> sp.	49	<1	NA	NA
POVI2	<i>Polygonum virginianum</i> L.	50	<1	NA	NA
RUAL	<i>Rubus allegheniensis</i> Porter	50	<1	NA	NA
SOCA3	<i>Solanum carolinense</i> L.	52	<1	NA	NA
GIBI2	<i>Ginkgo biloba</i> L.	53	NA	0.001	NA
ANOD	<i>Anthoxanthum odoratum</i> L.	54	<1	NA	NA
CYPERA	Cyperaceae sp.	54	<1	NA	NA
APCA	<i>Apocynum cannabinum</i> L.	56	<1	NA	NA
SACA15	<i>Sanicula canadensis</i> L.	57	<1	NA	NA
GECA7	<i>Geum canadense</i> Jacq.	58	<1	NA	NA
HAVI2	<i>Hackelia virginiana</i> (L.) I.M. Johnst.	59	<1	NA	NA
BRASSI	Brassicaceae sp.	60	<1	NA	NA
CIRSI	<i>Cirsium</i> sp.	61	<1	NA	NA
GLTR	<i>Gleditsia triacanthos</i> L.	62	NA	NA	0
AMAR2	<i>Ambrosia artemisiifolia</i> L.	63	<1	NA	NA
DIGIT2	<i>Digitaria</i> sp.	64	<1	NA	NA
PIPU2	<i>Pilea pumila</i> (L.) A. Gray	65	<1	NA	NA
SYOR	<i>Symphoricarpos orbiculatus</i> Moench	66	<1	NA	NA
ARTR	<i>Arisaema triphyllum</i> (L.) Schott	67	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
TAOF	<i>Taraxacum officinale</i> F.H. Wigg.	67	<1	NA	NA
VEBL	<i>Verbascum blattaria</i> L.	67	<1	NA	NA
VERON	<i>Veronica</i> sp.	67	<1	NA	NA
FESU3	<i>Festuca subverticillata</i> (Pers.) Alexeev	71	<1	NA	NA
PHLE5	<i>Phryma leptostachya</i> L.	72	<1	NA	NA
TRIFO	<i>Trifolium</i> sp.	72	<1	NA	NA
VEAL	<i>Verbesina alternifolia</i> (L.) Britton ex Kearney	72	<1	NA	NA
SOLID	<i>Solidago</i> sp.	75	<1	NA	NA
ACMI2	<i>Achillea millefolium</i> L.	76	<1	NA	NA
HEHE5	<i>Heliopsis helianthoides</i> (L.) Sweet	76	<1	NA	NA
POA	<i>Poa</i> sp.	76	<1	NA	NA
ROMU	<i>Rosa multiflora</i> Thunb.	76	<1	NA	NA
STELL	<i>Stellaria</i> sp.	76	<1	NA	NA
MOVE	<i>Mollugo verticillata</i> L.	81	<1	NA	NA
PHYSA	<i>Physalis</i> sp.	81	<1	NA	NA
PLMA2	<i>Plantago major</i> L.	81	<1	NA	NA
SMRO	<i>Smilax rotundifolia</i> L.	81	<1	NA	NA
ACRH	<i>Acalypha rhomboidea</i> Raf.	85	<1	NA	NA
COAR4	<i>Convolvulus arvensis</i> L.	85	<1	NA	NA
ERAN	<i>Erigeron annuus</i> (L.) Pers.	85	<1	NA	NA
LIGUS2	<i>Ligustrum</i> sp.	85	<1	NA	NA
POPE	<i>Podophyllum peltatum</i> L.	85	<1	NA	NA
RUOB	<i>Rumex obtusifolius</i> L.	85	<1	NA	NA
SACA13	<i>Sanguinaria canadensis</i> L.	85	<1	NA	NA
SOAL6	<i>Solidago altissima</i> L.	85	6	NA	NA
VIMI2	<i>Vinca minor</i> L.	85	<1	NA	NA
VIOLA	<i>Viola</i> sp.	85	<1	NA	NA
ALVI	<i>Allium vineale</i> L.	95	<1	NA	NA
CAREX	<i>Carex</i> sp.	95	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area per m ²	Mean ABH (cm ² per m ²)
CARYA	<i>Carya</i> sp.	95	<1	NA	NA
ERHI12	<i>Erechtites hieraciifolia</i> (L.) Raf. ex DC.	95	<1	NA	NA
EUPHO	<i>Euphorbia</i> sp.	95	<1	NA	NA
GAAP2	<i>Galium aparine</i> L.	95	<1	NA	NA
MUSC	<i>Muhlenbergia schreberi</i> J.F. Gmel.	95	<1	NA	NA
POAV	<i>Polygonum aviculare</i> L.	95	<1	NA	NA
TOAR	<i>Torilis arvensis</i> (Huds.) Link	95	<1	NA	NA
VETH	<i>Verbascum thapsus</i> L.	95	<1	NA	NA

Note: Mean canopy area is collected for shrubs. Mean area at breast height (ABH) is collected for trees. Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov).

Table 33: Per plot breakdown of species richness, diversity, and herbaceous cover at BLAN.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
BLAN_031	7	0.43	37
BLAN_032	28	2.3	162
BLAN_033	14	2.27	17
BLAN_034	8	0.75	21
BLAN_035	9	1.59	20
BLAN_036	24	2.37	94
BLAN_037	8	0.52	44
BLAN_038	10	0.71	36
BLAN_039	9	0.46	52
BLAN_040	9	1.64	16
BLAN_041	19	2.05	154
BLAN_042	6	0.29	37
BLAN_043	7	1.39	11
BLAN_044	15	2.28	53
BLAN_045	9	0.49	42
BLAN_046	4	0.15	39
BLAN_047	31	2.76	123

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
BLAN_048	23	2.85	35
BLAN_049	13	1.64	38
BLAN_050	15	1.97	45
BLAN_051	11	1.89	17
BLAN_052	10	1.82	36
BLAN_053	24	1.99	148
BLAN_054	8	0.46	38
BLAN_055	18	1.43	100
BLAN_056	9	0.66	37
BLAN_057	11	1.48	216
BLAN_059	8	0.46	41
BLAN_060	10	1.78	20
BLAN_063	23	2.18	94

Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot.

6.4 Beetles

6.4.1 Site-Specific Methods

No beetle site characterization was conducted at BLAN. For more information on this protocol and data product numbers see Appendix A.

6.5 Mosquitoes

6.5.1 Site-Specific Methods

No mosquito site characterization was conducted at BLAN. For more information on this protocol and data product numbers see Appendix A.

6.6 Ticks

6.6.1 Site-Specific Methods

No tick site characterization was conducted at BLAN. For more information on this protocol and data product numbers see Appendix A.

Title: TOS Site Characterization Report: Domain 02		Date: 01/05/2017
NEON Doc. #: NEON.DOC.003886	Author: R.Krauss	Revision: A

6.7 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]). See the SCBI species reference list section for statewide resources.

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. *ZooKeys*, (245), 1-1722.

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic/_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

University of Virginia Blandy Experimental Farm. *Species Lists for Blandy Experimental Farm*. Retrieved from <http://blandy.virginia.edu/research/species-lists-for-blandy>

7 REFERENCES

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, *PE&RS*, Vol. 77(9):858-864.

USDA, NRCS. 2016. The PLANTS Database (<http://plants.usda.gov>, 1 August 2016). National Plant Data Team, Greensboro, NC 27401-4901 USA.

8 APPENDIX A: DATA PRODUCT NUMBERS

For more information on the sampling protocols and the latest observatory data visit <http://data.neonscience.org/data-product-catalog> and search by name or code number.

Table 34: NEON data product names and descriptions.

Name	Description	Identification Code
Root sampling (megapit)	Fine root biomass in 10cm increments (first 1m depth) and 20cm increments (from 1m to 2m depth) from soil pit sampling	NEON.DOM.SITE.DP1.10066

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NEON Doc. #: NEON.DOC.003886	Author: R.Krauss	Revision: A

Name	Description	Identification Code
Soil physical properties (Megapit)	Soil taxonomy, horizon names, horizon depths, as well as soil bulk density, porosity, texture (sand, silt, and clay content) in the <= 2 mm soil fraction for each soil horizon. Data were derived from a sampling location expected to be representative of the area where the Instrumented Soil Plots per site are located and were collected once during site construction. Also see distributed soil data products.	NEON.DOM.SITE.DP1.00096
Soil chemical properties (Megapit)	Total content of a range of chemical elements, pH, and electrical conductivity in the <= 2 mm soil fraction for each soil horizon. Data were derived from a sampling location expected to be representative of the area where the Instrumented Soil Plots per site are located and were collected once during site construction. Also see distributed soil data products.	NEON.DOM.SITE.DP1.00097
Woody plant vegetation structure	Structure measurements, including height, canopy diameter, and stem diameter, as well as mapped position of individual woody plants	NEON.DOM.SITE.DP1.10098
Plant presence and percent cover	Plant species presence as observed in multi-scale plots: species and associated percent cover at 1-m ² and plant species presence at 10-m ² , 100-m ² and 400-m ²	NEON.DOM.SITE.DP1.10058
Plant phenology observations	Phenophase status and intensity of tagged plants	NEON.DOM.SITE.DP1.10055
Plant foliar stable isotopes	Field collection metadata describing the sampling of sun-lit canopy foliar tissues for stable isotope compositions. Also includes raw data returned from the laboratory.	NEON.DOM.SITE.DP1.10053
Plant foliar physical and chemical properties	Plant sun-lit canopy foliar physical (e.g., leaf mass per area) and chemical properties reported at the level of the individual.	NEON.DOM.SITE.DP1.10026
Non-herbaceous perennial vegetation structure	Field measurements of individual non-herbaceous perennial plants (e.g. cacti, ferns)	NEON.DOM.SITE.DP1.10045.
Ground beetles sampled from pitfall traps	Taxonomically identified ground beetles and the plots and times from which they were collected.	NEON.DOM.SITE.DP1.10022
Ground beetle sequences DNA barcode	CO1 DNA sequences from select ground beetles	NEON.DOM.SITE.DP1.10020
Mosquitoes sampled from CO2traps	Taxonomically identified mosquitoes and the plots and times from which they were collected	NEON.DOM.SITE.DP1.10043
Mosquito-borne pathogen status	Presence/absence of a pathogen in a single mosquito sample (pool)	NEON.DOM.SITE.DP1.10041

<i>Title:</i> TOS Site Characterization Report: Domain 02		<i>Date:</i> 01/05/2017
<i>NEON Doc. #:</i> NEON.DOC.003886	<i>Author:</i> R.Krauss	<i>Revision:</i> A

Name	Description	Identification Code
Mosquito sequences DNA barcode	CO1 DNA sequences from select mosquitoes	NEON.DOM.SITE.DP1.10038
Ticks sampled using drag cloths	Abundance and density of ticks collected by drag and/or flag sampling (by species and/or lifestage)	NEON.DOM.SITE.DP1.10093
Tick-borne pathogen status	Presence/absence of a pathogen in each single tick sample	NEON.DOM.SITE.DP1.10092